

Plans Examiner – Course Syllabi

PE: Planning Processes for the Plans Examiner

Unit 1: Introduction

Topic 1: Orientation and Administration	1:00
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Unit 2: The Role of the Plans Examiner

Topic 1: Terminology	0:30
Topic 2: Responsibilities of the Plan Reviewer	0:30
Topic 3: Plan Review Jurisdictions and Agencies	1:00
Topic 4: The Role of the Plan Reviewer	1:00

Unit 3: The Plan Review Process

Topic 1: Plans Submittal and Processing	1:00
Topic 2: Approving Plans and Issuing Permits	1:00
Topic 3: Deficiency Mitigation	1:30

Unit 4: Developing and Maintaining Plan Review Policies and Procedures

Topic 1: Maintaining a Plan Review Library	0:30
Topic 2: Policies and Procedures	1:00
Topic 3: Plan Review Forms and Checklists	1:00

Unit 5: The Plan Submittal Process

Topic 1: Plan Submittal	1:30
Topic 2: Symbols and Measurements	1:30
Topic 3: Triaging Plans for Compliance	2:00

Unit 6: Reviewing Site/Plot/Utility Plans

Topic 1: Access and Water Supply	3:00
Topic 2: Wildland Urban Interface	6:00

Unit 7: Evaluating Alternative Design Methods

Topic 1: Documentation	1:00
Topic 2: Determining Equivalency	1:00
Topic 3: Appeals	0:30
Topic 4: Performance-Based Design	0:30

Unit 8: Evaluating Renovations, Tenant Improvements, and Temporary Structures

Topic 1: Tenant Improvements, Building Renovations and Additions (Enlargements)	1:00
Topic 2: Damaged Building Repair	0:30
Topic 3: Historic Building Conversions	1:30
Topic 4: Tents and Membrane Structures	1:00
Topic 5: Demolition and Fire Safety During Construction	0:30

PE: Plan Review of Fire Protection Equipment and Systems

Unit 1: Introduction

Topic 1: Orientation and Administration1:00

Unit 2: Evaluating Fire Protection System Plans

Topic 1: Terminology and Components###

Topic 2: Automatic Fire Sprinkler Systems###

Topic 3: Evaluating Automatic Fire Sprinkler Systems###

Topic 4: Standpipe Systems###

Topic 5: Fire Alarm System Functions and Components###

Topic 6: Evaluating Fire Alarm System Plans###

Topic 7: Elevators###

Topic 8: Fire Command Centers###

Topic 9: Engineered and Pre-Engineered Fixed Extinguishing Systems###

Topic 10: Smoke Control Systems###

Topic 11: Portable Fire Extinguishers###

PE 2-8: Describe Evaluating Other Hazardous Processes and Operations Plans for Regulatory Compliance

PE: Plan Review of Architectural Features, Fire Operational Features, and Hazardous Materials

Unit 1: Introduction

Topic 1: Orientation and Administration	###
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Unit 2: Reviewing Architectural and Structural Plans

Topic 1: Terminology and Symbols	1:00
Topic 2: Occupancy and Construction Types	1:00
Topic 3: Allowable Height and Area and Property Location	4:00
Topic 4: Special Detailed Occupancy Requirements	3:00
Topic 5: Means of Egress	3:00
Topic 6: Fire-Resistance-Rated Construction	2:00
Topic 7: Interior Finishes	1:00
Topic 9: Special Use Features and Other Building Elements	3:00

Unit 3: Evaluating Mechanical, Plumbing, And Electrical Plans

Topic 1: Electrical Plan Review	3:00
Topic 2: Mechanical and Plumbing Plan Review	3:00
Topic 3: Penetration of Fire-Resistance-Rated Construction	1:00

Unit 4: Hazardous Materials Processing and Storage

Topic 1: Terminology and Special Markings for Hazardous Materials Storage	1:00
Topic 2: Title	2:30
Topic 3: Hazardous Materials Storage Control Areas	1:30

Unit 5: Manufacturing, Processing, Use, Storage, Handling, and Dispensing of Hazardous Materials

Topic 1: Exterior and Interior Manufacturing Processing, Use, Storage, Handling, and Dispensing	2:30
Topic 2: Open and Closed Systems Requirements	1:00
Topic 3: Secondary Containment for Hazardous Materials	0:30

Unit 6: Requirements for Spraying and Dipping of Flammable and Combustible Liquids

Topic 1: Terminology	0:30
Topic 2: Requirements	1:00

Unit 7: Medical and Laboratory Gas Systems

Topic 1: Terminology	0:30
Topic 2: Evaluating Medical and Laboratory Gas Systems	1:00

Unit 8:Evaluating Refrigerant Systems

Topic 1: Terminology	0:30
Topic 2: Evaluating Refrigerant Systems	1:30

Unit 9: Evaluate Alternative Fuels for Motorized Vehicles

Topic 1: Terminology	0:30
Topic 2: Evaluating Alternative Fuels for Motorized Vehicles	1:00

**Course:** PE: Planning Processes for the Plans Examiner

CFSTE

Hours: 66:00 (63:00 = instruction / 3:00 = testing)**Designed For:** [text]

Description: Upon completion of this course, the student be equipped with an introduction to the roles and responsibilities of the Plans Examiner; information about the plan review and submittal process; and practical skills to develop and maintain plan review policies and procedures, review site/plot/utility plans, evaluate alternative design methods, and evaluate renovations, tenant improvements, and temporary structures.

Prerequisites: [text]**Passing Criteria:** [text]**Certification:** [text]**Class Size:** [text]**Restrictions:** [text]

REQUIRED STUDENT MATERIALS		EDITION	VENDORS
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REQUIRED INSTRUCTOR MATERIALS		EDITION	VENDORS
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VENDORS			
SFT	State Fire Training Bookstore (916-445-8158)	http://sft.fire.ca.gov	

PE: PLANNING PROCESSES FOR THE PLANS EXAMINER COURSE SYLLABUS

Course Objectives: to provide the student with...

- An introduction to the roles and responsibilities of the Plans Examiner
- Information about the plan review process
- Practical skills to develop and maintain plan review policies and procedures
- Information about the plan submittal process
- Practical skills to review site/plot/utility plans
- Practical skills to evaluate alternative design methods
- Practical skills to evaluate renovations, tenant improvements, and temporary structures

Course Content 63:00

Unit 1: Introduction

Topic 1: Orientation and Administration 1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

[text]

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Unit 2: The Role of the Plans Examiner (CTS: 1-1)

Topic 1: Terminology0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define terms commonly used by a Plans Examiner.

Enabling Learning Objectives (ELO):

1. Define terms commonly used by a Plans Examiner, including:

- Occupancy classification
- Allowable building height and area
- Type of construction
- Location on property
- Means of egress
- Fire-resistive construction
- Roof assembly and roof covering
- Fire protection systems
- Wildland urban interface

Discussion Questions

1. [text]

Activities

1. Instructor-created activity that evaluates and establishes the level of understanding and comprehension of specific terminology common in the plan review process. Examples may include word association/matching exercise, crossword puzzle, photo identification exercise, or class competition.

Evaluation: Formative Test, Summative Test

Topic 2: Responsibilities of the Plan Reviewer0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe legally established responsibilities and empowerment related to the performance of the duties of a Plans Examiner

Enabling Learning Objectives (ELO):

1. Describe legally established responsibilities and empowerment related to the performance of the duties of a Plans Examiner, including:

- Community safety
- Property conservation
- Firefighter safety
- Economic implications
- Code compliance
- Historic preservation
- Increased awareness of hazards
- Authority of the Building Official (CBC Section 104)
- Authority of the Fire Code Official (CFC Section 104)

Discussion Questions

1. What are some examples of economic concerns for construction projects?

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 3: Plan Review Jurisdictions and Agencies.....1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe other jurisdictional departments or agencies that have requirements or conduct plan reviews relating to life safety or fire prevention.

Enabling Learning Objectives (ELO):

1. Describe other local jurisdictional departments or agencies that have requirements or conduct plan reviews relating to life safety or fire prevention, including:
 - Building Department
 - Health Department
 - Planning/Zoning Department
 - Water Purveyor
2. Describe other state jurisdictional departments or agencies that have requirements or conduct plan reviews relating to life safety or fire prevention, including:
 - Division of State Architect
 - Cal Fire/State Fire Marshal
 - Office of Statewide Health Planning & Development
 - Housing and Community Development
 - California Department of Public Health
 - California Department of Fish & Game
 - Air Quality Management Districts

Discussion Questions

1. What are some of the overlaps between the fire department and the building department?
2. How do plan reviewers communicate with other agencies, particularly state agencies?

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 4: The Role of the Plan Reviewer1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe the role of the plan reviewer.

Enabling Learning Objectives (ELO):

1. Describe the role of the Plans Examiner, including:
 - Continuing education to maintain proficiency and currency in construction methodologies
 - Participating in pre-design meetings to identify jurisdictional requirements for design and submittal of plans
 - Ensuring that planning conditions of approval are satisfied at the time of plan submittal
 - Reviewing plans for fire and life safety code compliance
 - Interpreting and applying applicable codes, standards, and policies of the jurisdiction
 - Communicating with fire inspectors, emergency response personnel, and design professionals
 - Conducting code-related research
 - Creating plan review checklists and forms
 - Developing policies and procedures for the administration of plan review functions
 - Evaluating alternative methods of compliance and alternate methods of protection
 - Facilitating resolution of design deficiencies
 - Maintaining records and archiving of plans
 - Participating in legal proceedings
 - Preparing correspondence and plan review reports
 - Requesting additional expertise as required

Discussion Questions

1. Why is continuing education for plan reviewers important?

Activities

1. (Group activity) Have the class prepare a list of their perception of the role of the plan reviewer.
What are all of the things a plan reviewer is responsible for?

Evaluation: Formative Test, Summative Test

Unit 3: The Plan Review Process (CTS: 2-1)

Topic 1: Plans Submittal and Processing1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to review plans and specifications for conformance with applicable codes, standards, and policies of the jurisdiction.

Enabling Learning Objectives (ELO):

1. Describe the plan submittal process, including:
 - Applications and permits
 - Fees
 - Receiving plans
 - Size of plans
 - Number of copies
 - Triage of plans
 - Supporting documents
 - Hydraulic calculations
 - Specifications
 - Material safety data sheets (MSDS)
 - Product information sheets (cut sheets)
 - Criteria for rejection of plans
2. Describe the plan review sequence, including:
 - One-stop plan review
 - Systematic approach of the review
 - Partial permit review (foundation only)
 - Incremental plan review
 - Site preparation increment
 - Foundation increment
 - Structural frame increment
 - Shell and core increment
 - Tenant improvement increment
 - Identification of deficiencies
 - Code violations
 - Statute violations
 - Incorrect design
 - Missing information
 - Plan approval
 - Plan revisions
 - Record keeping

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 2: Approving Plans and Issuing Permits1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to approve plans and specifications for conformance with applicable codes, standards, and policies of the jurisdiction.

Enabling Learning Objectives (ELO):

1. Describe the procedures for approving plans for new and existing conditions, including:
 - Approving code-compliant plans
 - Approving non-code-compliant plans with comments
 - Stamping
 - Signing
2. Identify and process required permits (construction or operational-use)
 - Plan approval documentation
 - Licensed contractor vs. owner/builder (workers' comp)
 - Permit issuance
3. Identify the reasons and the process for records retention and plan archiving, including:
 - Official documents
 - Permit verification
 - Verification of unpermitted work
 - Historical reference for construction in the building
 - Record set for reference during construction
 - As-built set of plans at end of project
 - Filing with county agencies (Tax Assessor)
 - Microfiche of plans
 - Digital scanning of plans and specifications
 - Timeframe for records archives

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 3: Deficiency Mitigation1:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to verify and resolve deficiencies.

Enabling Learning Objectives (ELO):

1. Describe how deficiencies are verified, including:
 - Systematic plans review
 - Observing and documenting deficiencies
 - Identifying deficiencies
 - Code violations
 - Statute violations
 - Incorrect design
 - Missing information
 - Reporting deficiencies in accordance with the policies of the jurisdiction
 - Noting deficiencies directly on the plans
 - Noting deficiencies on a separate report
 - Discuss directly with designer
2. Describe the procedures for resolving deficiencies, including:
 - Immediately rejecting plans that are incomplete
 - Returning plans and specifications to designer with deficiencies noted
 - Reviewing re-submittals of corrected plans and specifications
 - Reviewing designer's written responses to noted deficiencies
 - Reviewing proposed alternatives to prescriptive code compliance
 - Alternate methods of compliance
 - Alternate methods of protection

- Engineered analysis proposal
- Referring to appropriate level when necessary

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Unit 4: Developing and Maintaining Plan Review Policies and Procedures (CTS: 2-1 and 2-2)

Topic 1: Maintaining a Plan Review Library0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to maintain a library of codes, standards, ordinances, and checklists necessary to perform an adequate plan review.

Enabling Learning Objectives (ELO):

1. Describe the procedures for maintaining a library of codes, standards, ordinances, and checklists necessary to perform an adequate plan review, including:
 - Current codes, standards, and ordinances legally adopted by the jurisdiction
 - Insertion of amendments, errata, and updates
 - Consideration of online codes
 - Historic codes, standards, and ordinances legally adopted by the jurisdiction

Discussion Questions

1. How far back should the historic codes go?

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 2: Policies and Procedures1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to develop and maintain policies and procedures for administering plan review functions.

Enabling Learning Objectives (ELO):

1. Describe the procedures for developing and maintaining policies and procedures for administering plan review functions, including:
 - Consistent application of policies and procedures
 - Identifying impact on other governmental agencies
 - Identifying information sources
 - Identifying technical assistance used in the development
 - Meeting legal obligations of the jurisdiction
 - Application for plan review
 - Fees
 - Qualifications of the design professional responsible for the preparation of the plans and specifications
 - Stamping and signing of the plans and specifications
 - Criteria for preliminary plans submittals
 - Criteria for final plans and specifications submittals
 - Performance-based code plan review
 - Deferred approval submittals
 - Post approval plan review
 - Time limitations for reviews

Discussion Questions

1. What information is important to determine at the application process?

Activities

1. To be determined by the instructor.
Evaluation: Formative Test, Summative Test

Topic 3: Plan Review Forms and Checklists1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to create plan review checklists and forms.

Enabling Learning Objectives (ELO):

1. Describe and demonstrate creating plan review checklists and forms, including:
 - Addressing key issues to prevent reviewers from overlooking key aspects of design
 - Clearly expressing code requirements of the jurisdiction
 - Logical and complete format
 - Addressing projects typically submitted to the jurisdiction
 - Stating compliance with checklist does not ensure complete code compliance

Discussion Questions

1. What are the pros and cons of using checklists for plan review?

Activities

1. Have students bring plan review checklists used in their jurisdictions and compare them to each other.

Evaluation: Formative Test, Summative Test

Unit 5: The Plan Submittal Process (CTS: 2-3)

Topic 1: Plan Submittal1:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe the importance and purpose of construction plans and specifications during the plan review process.

Enabling Learning Objectives (ELO):

1. Describe the importance and purpose of construction plans and specifications:
 - The third "E" of the 3E's: Engineering
 - Provides a comprehensive document for owner, contractor and designer to build from
 - Provides opportunity for jurisdictional input, evaluation, and oversight
2. Describe the components review during the plan review process, including:
 - Fire protection features
 - Sprinklers
 - Standpipes
 - Fire alarm
 - Fire extinguishers
 - Smoke control
 - Site access
 - Water supply
 - Occupancy classification
 - Construction type
 - Original type of construction (existing)
 - Allowable height and area
 - Location of building on site
 - Extent of special detailed occupancy requirements
 - Covered malls
 - High rise buildings
 - Atriums
 - Motor vehicle-related occupancies
 - I-2 and I-3 occupancies
 - H occupancies

- Calculation of occupant load
- Means of egress
- Fire-resistance-rated construction elements
 - Exterior walls
 - Fire walls
 - Fire barriers
 - Fire partitions
 - Smoke barriers
 - Smoke partitions
 - Shaft enclosures
 - Horizontal assemblies
 - Structural members
 - Opening protectives
 - Ducts and air transfer openings
- Interior floor, wall and ceiling finishes
- Special use features
 - Stages and platforms
 - Combustible storage
 - Hazardous materials
 - Application of flammable finishes
- Roof assemblies and roof coverings
- Environmental documentation (wildland urban interface)
- Performance-based design
- Practical difficulty
- Resubmittal with alternate method of design
- Special requirements based on local project approval process

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 2: Symbols and Measurements1:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe the importance and purpose of abbreviations, symbols, and units of measure on construction plans and specifications during the plan review process.

Enabling Learning Objectives (ELO):

1. Describe the abbreviations and symbols used on submitted plans and specifications, including:
 - Common architectural symbols
 - Common fire protection symbols
 - Common electrical symbols
 - Common mechanical symbols
 - Common plumbing symbols
 - Common civil engineering symbols
2. Describe the units of measurement/scales used for the plan review process and their relationship to the submitted drawings and specifications, including:
 - Scale types
 - Engineering measurement
 - Architectural measurement
 - Determining measurement on plans
 - Using appropriate architecture scale, measure length on the drawing

- Use the dimension given on the drawing
- Calculate the length from other dimensions
- Column gridlines

Discussion Questions

1. [text]

Activities

1. Provide an exercise that involves using an architectural scale and engineering scale to determine simple measurement on a basic plan.
2. Provide an exercise that compares plan legends to symbols.

Evaluation: Formative Test, Summative Test

Topic 3: Triaging Plans for Compliance.....2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe the procedures for evaluating the critical specific elements of a plan submittal to confirm there is sufficient information to conduct a meaningful plan review
2. Describe how to quickly triage each section of the plan when it is received to:
 - Become familiar with the overall project
 - Evaluate its completeness
 - Verify receipt of specifications, calculations, etc. if applicable
 - Identify alternate means of compliance/protection requests
 - Confirm that the drawings and specifications are complete enough to perform a plan review
 - Establish an estimated time budget for review
3. Describe what to triage in the architectural section of the plans:
 - Floor plans
 - Building summary and code analysis
 - Means of egress
 - Occupancy uses
 - Passive fire protection features
 - Interior finishes
 - Location of doors, windows, walls
 - Fire protection equipment
 - Reflected ceiling plans
 - Exit signs
 - Emergency lighting
 - Smoke detector placement
 - Sprinkler head locations
 - Roof plans
 - Roof covering
 - Roof openings
 - Skylights
 - Helistops
 - Penthouses and mansards
 - Parapets
 - Roof-mounted equipment
 - Exterior elevations
 - Exterior walls and openings
 - Eaves and overhangs
 - Porte cocheres
 - Pedestrian walkways
 - Building sections

- Wall, roof and ceiling details
 - Floor construction
 - Horizontal assemblies
 - Stairs
 - Shafts
 - Atria
 - Dimensions
 - Corridor construction
 - Interior elevation
 - Details of walls
 - Openings in walls
 - Soffits
 - Equipment placement and mounting
 - Fireplaces and hearths
 - Schedules
 - Door schedules and details
 - Window schedules and details
 - Wall schedules and details
 - Finish schedules
 - Details
 - Installation
 - Anchorage
 - Framing
 - Bracing
 - Coordination
 - Fire-resistive assemblies (joints, penetrations, dampers, etc.)
4. Describe what to triage in the civil/site section of the plans:
- Fire department access roads
 - Fire hydrants
 - Fire department connections
 - Post indicator valves
 - Backflow prevention devices
 - Hazardous materials piping
 - Exit discharge
 - Utilities (shut offs)
5. Describe what to triage in the electrical section of the plans:
- Electrical service
 - Transformers
 - Electrical switchgear and panel rooms
 - Lighting, normal and emergency
 - Power
 - Signal, communication and IT
 - Fire alarm
 - Exit signs
 - Emergency power and uninterruptable power systems
 - Photovoltaic systems
 - Hazardous locations and explosion-proof wiring
6. Describe what to triage in the fire protection section of the plans:
- Sprinkler systems
 - Standpipe systems
 - Fire suppression systems

- Fire alarm and detection systems
 - Automatic elevators
 - Fire command/control centers
 - Smoke control systems
 - Fire extinguishers
 - Hazardous materials storage and processes
 - Membrane structures
7. Describe what to triage related for fire safety during construction and demolition:
- Temporary standpipes
 - Temporary means of egress
 - Construction barricades
 - Pedestrian protection
 - Maintenance of fire protection systems
8. Describe what to triage related to local requirements:
- Building address requirements
 - Fire lane identification
 - Fire alarm annunciation
 - Ladder apparatus location
 - Special signage requirements (way-finding)
9. Describe what to triage on the mechanical section of the plans:
- HVAC and corresponding ductwork and piping
 - Air balance and pressure relationships
 - HVAC shutdown
 - Exhaust systems
 - Cooking equipment
 - Fume hoods
 - Hazardous material storage areas
 - Dust collection system
 - Explosion venting
 - Combustion air openings and ductwork
 - Refrigeration
 - Ductwork penetration of walls and floors
10. Describe what to triage on the plumbing section of the plans:
- Fuel gas piping
 - Water supply piping and shutoffs
 - Drainage systems and vents
 - Pumps
 - Hazardous materials piping
11. Describe what to triage related to preliminary design presentation:
- Sufficient information to articulate the overall design
 - Proposed occupancy and construction type
 - Proposed location on site
 - Proposed height and area
 - General layout of means of egress system
 - Alternative code compliance and performance-based code rational analysis
12. Describe what to triage on the structural section of the plans:
- Structural members
 - Primary and secondary
 - Construction
 - Roof framing
 - Floor framing

- Anchorage, hanging and bracing
- 13. Describe what to triage related to a wildland urban interface management plan
- 14. Describe other miscellaneous items to triage including:
 - Kitchen equipment
 - Security features
- 15. Describe the procedures for evaluating the critical supplemental documentation, plans, and specifications, test reports, cut-sheets, and calculation sheets that may be included, as part of the plan submittal, or be deferred to a later review time
 - Quickly triage each section of the supplemental documentation when the plan is received to:
 - Evaluate its completeness
 - Identify alternate means of compliance/protection requests
 - Confirm that the supplemental documents are appropriate and are complete enough to perform a plan review
 - Establish an estimated time budget for review
 - In particular, triage the following specialties:
 - Insulation and caulking
 - Door hardware
 - Specialty assemblies
 - Interior finish materials
 - Equipment specifications

Discussion Questions

1. What should you do if the specifications or calculations are missing from the plan submittal package?

Activities

1. Develop an exercise to demonstrate a quick triage of a new two story office building.

Evaluation: Formative Test, Summative Test

Unit 6: Reviewing Site/Plot/Utility Plans (CTS: 2-4)

Topic 1: Access and Water Supply 3:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate required water delivery and emergency vehicle access infrastructure requirements for development within the jurisdiction.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate required water delivery infrastructure requirements for development within the jurisdiction, including:
 - Fire flow calculations
 - Hydrant locations
 - Public and private
 - Rural private
2. Describe how to evaluate required emergency vehicle access infrastructure requirements of the jurisdiction, including:
 - Bridges
 - Emergency vehicle access to open areas
 - Exit discharge
 - Gates
 - Grade determination
 - Load-bearing capability
 - Roadway width and clearance
 - Secondary access
 - Traffic calming

Discussion Questions

1. [text]

Activities

1. To be determined by the instructor.

Evaluation: Formative Test, Summative Test

Topic 2: Wildland Urban Interface.....6:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate the wildland urban interface codes, standards, and policies of the jurisdiction applicable to landscape plans; the infrastructure considerations for grading and improvement plans; design and maintenance standards for open space areas adjacent to new development projects; ignition-resistant standards relating to buildings located within the wildland urban interface; and fuel management considerations on landscape plans for buildings in the wildland urban interface.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate the wildland urban interface codes, standards, and policies of the jurisdiction applicable to landscape plans, including:
 - General Plan (Government Code 65300-65307)
 - Planning law requires each city and county to adopt a long-term, comprehensive plan for physical development of jurisdiction
 - Must include the following elements to identify hazards and propose mitigation measures (Government Code 65302)
 - Land use
 - Circulation
 - Housing
 - Conservation
 - Noise
 - Safety
 - Policy and mitigation measures are an opportunity to address such issues as:
 - Emergency services
 - Water supply
 - Housing density and setbacks
 - Fire effects
 - Urban interface fire hazards
 - Fuel breaks and fuel reduction zones
 - Road design standards and evacuation routes
 - California Environmental Quality Act (CEQA) (Public Resources Code 21000 et seq)
 - An initial review of each project and its potential environmental effects must be conducted
 - Depending on potential impacts further review may be conducted in the form of an Environmental Impact Report (EIR)
 - A project may not be approved as submitted if feasible alternatives or mitigation measures are able to substantially lessen the significant environmental effects of the project
 - Review of project components, including but not limited to:
 - Roads
 - Water supply
 - Structure density
 - Location
 - Evaluation of fuels and proposed mitigation
 - Defensible space and long-term fuel management
 - Identification of mitigation measures
 - Used to reduce significance of negative impacts

- May include specific requirements such as infrastructure improvements, fuel modification or open space management plans, site specific requirements
 - Assure compliance through mitigation monitoring plan
 - Other planning tools
 - Specific Plan
 - Used for large development projects constructed in phases
 - Must be consistent with the General Plan
 - Sets land use specifications and implementation programs
 - May specify construction and infrastructure improvement timing
 - Development agreements
 - Contractual agreement between city/county and a developer
 - Vests development rights for specific project
 - Establishes zoning and development regulations for a specific period of time
 - Allows local jurisdiction to obtain additional requirements from developer in excess of legal minimums such as:
 - Higher design standards
 - Public facilities
 - Other enhances infrastructure improvements
 - Important to make sure fire prevention, protection and mitigations are consistently required throughout the term of the agreement
2. Describe the infrastructure considerations for grading and improvement plans, including:
- Circulation, access, and egress
 - Road width, grade, surfacing materials, turning radius, turnaround provisions, and multiple points of access into or out of area
 - Special design requirements may apply in State Responsibility Areas (SRA) (PRC 4290)
 - Open space areas and fire trails
 - Used to gain access to open space behind housing tracts
 - Design and maintenance standards
 - Establishing access easements to assure long-term availability
 - Water supply
 - Public vs. private water supply
 - Public supply generally more reliable but not always available
 - Reduced pressure available due to elevation
 - Rural or semi-rural situations due to lack of infrastructure
 - Local ordinance, standard or NFPA 1142, Standard on Water Supplies for Suburban and Rural Fire Fighting may be useful resource
 - Special design requirements may apply in State Responsibility Areas (SRA) (PRC 4290)
 - Areas of refuge
 - May be incorporated into areas where egress provisions are poor and residents may need safe location to stay when fire passes
3. Identify and evaluate design and maintenance standards for open space areas adjacent to new development projects, including:
- Establishing a management plan for control of existing vegetation and establishing fire breaks
 - Usually required as part of planning process or local ordinance and may be developed by a third-party expert
 - Annual grasses
 - Mowing, disking, use of herbicides, etc.
 - Trimming/removal of ground cover and brush to control fire spread and laddering fuels
 - Trimming trees and controlling tree density near development areas to reduce potential of crown fires
 - Long-term maintenance provisions

- Responsible party should be identified in plan
 - Homeowners associations
 - Geological Hazard Abatement Districts
 - Deeding of property to public agency
 - Identify standards and expectations
 - May include open space access maintenance provisions
4. Describe how to evaluate ignition-resistant standards relating to buildings located within the wildland urban interface, including:
- Intent of ignition-resistant standards
 - Protect structures from flame impingement
 - Protect structures from radiant heat
 - Protect structures from flying embers
 - Applicability to new structures as specified in California Building Code, Chapter 7A:
 - SRA Very High, High and Moderate Hazard Fire Severity Zones
 - LRA Very High Hazard Fire Severity Zones
 - Other regulatory and non-regulatory mandates:
 - General Plan
 - CEQA
 - Development agreement processes
 - Local ordinances
 - Enforcement responsibility:
 - Building Official enforces CBC Chapter 7A
 - Fire Code Officials may enforce by agreement
 - Construction standards:
 - Roofing
 - Exterior siding
 - Exterior doors and windows
 - Vents
 - Ancillary structures including
 - Decks, fences and ancillary structures
 - Prescriptive- and performance-based design standards
 - Additional resources to evaluate materials compliance
 - CalFire/SFM CBC Chapter 7A Compliance Policies and Code Interpretations
 - ASTM and CalFire/SFM wildfire protection building construction test standards (CCR Title 24 Part 12 and ASTM E2702)
5. Describe how to evaluate fuel management considerations on landscape plans for buildings in the wildland urban interface, including:
- Purpose of fuel management
 - To limit the likelihood of rapid fire spread through a property
 - To reduce radiant heat exposure to structures
 - Meeting aesthetic and functional desires of the property owner
 - Applicability
 - New structures in LRA Very High Fire Hazard Severity Zone
 - New structures in SRA Very High, High and Moderate Fire Hazard Severity Zones
 - Must comply with PRC 4291 and Government Code 51182
 - Elements of submittal
 - Site plan detailing new and existing landscape features including, but not limited to:
 - Location of structure on property
 - Topography
 - Plant species, location and density
 - Location of primary and ancillary structures

- Location of driveways and or turnaround provisions
- Irrigation plan
- Considerations
 - Proximity of vegetation to structures
 - Size and species of vegetation
 - Fuel density
 - Proximity to structures on adjacent property
 - Proximity to access roadway
- Maintenance plan
 - General standards for fuel management
 - Specify annual or other periodic management activities
 - Control of annual grasses

Discussion Questions

1. Given a proposed residential development project in a wildland urban interface, what are the potential negative impacts to a fire agency's ability to provide fire services?
2. What is the purpose of CEQA requirements as they relate to the fire service?

Activities

1. Given a planned urban development, identify fire access, water supply, and wildland urban interface considerations.
2. Given a single family dwelling site plan in a Very High Fire Hazard Severity Zone, evaluate the plan for compliance with Chapter 7A, CBC.

Evaluation: Formative Test, Summative Test

Unit 7: Evaluating Alternative Design Methods (CTS: 2-9)

Topic 1: Documentation.....1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate a basic set of factual documents used during the review of a proposed alternate method of design or protection.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate a basic set of factual documents used during the review of a proposed alternate method of design or protection, including:
 - The fire exposure and acceptance criteria
 - Compliance with the intent of the provisions of the code
 - Valid research reports from approved sources
 - Format acceptable to AHJ
 - Narrative format that clearly describes all aspects of the design, including:
 - Hourly rating required
 - Complete description of all critical elements
 - Any non-standard conditions
 - Clear directions for the installation
 - The fire-resistive design(s) that the alternate is based on
 - Prepared and signed by qualified technical personnel
 - Existing tested, listed systems that are comparable in application or cover equivalent conditions
 - Empirical evidence from recognized engineering resources, when necessary
 - Specific conditions and configurations based upon reasonable performance expectations for the proposed system

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 2: Determining Equivalency.....1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate the requirements for determining equivalences and alternate methods for fire protection and building systems.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate the requirements for determining equivalences and alternate methods for fire protection and building systems, including:
 - Determining equivalency to prescriptive code in:
 - Quality
 - Strength
 - Effectiveness
 - Fire resistance
 - Durability
 - Safety
 - Reliability
 - Reviewing supporting data to assist in the approval of materials or assemblies not specifically provided for in this code
 - Data shall consist of valid research reports from approved sources
 - Requiring tests as evidence of compliance
 - Review and approve the test methods to ensure it is as specified in the code
 - Review and approve other recognized test standards
 - Approve the testing agency
 - Ensuring reports of such tests are retained for the period required for retention of public records

Discussion Questions

1. [text]

Activities

1. In small groups, discuss the merits of a proposal to omit fire sprinkler protection from a 4'-2" combustible exterior overhang.

Evaluation: Formative Test, Summative Test

Topic 3: Appeals.....0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate the requirements for the appeals board process.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate the requirements for the appeals board process, including:
 - Describing appeals and their purpose
 - Appeals to state adopted codes shall be in accordance with Authority: CCR Title 19, section 2.03 – through the State Board of Fire Services
 - Appeals to non-state adopted codes go through the procedure based on regulation in each jurisdiction
 - An application to a recognized authority for vindication, corroboration, or decision
 - An individual can appeal if he or she does not agree with an order, decision, or determination made by a fire official
 - Determining the reason for the appeal
 - Applicant disagrees with the code
 - Applicant has a proposed alternate
 - Situation presented is unique and not covered by existing code

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 4: Performance-Based Design0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate the requirements for performance based design process, application process, and acceptance process.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate the requirements for performance-based design process, application process, and acceptance process:
 - Identify goals
 - Develop performance-based criteria
 - Develop fire scenarios
 - Develop trial designs
 - Evaluate trial designs
 - Select final design
 - Prepare design documentation

Discussion Questions

1. [text]

Activities

1. To be determined by the instructor.

Evaluation: Formative Test, Summative Test

Unit 8: Evaluating Renovations, Tenant Improvements, and Temporary Structures (CTS: 2-10)

Topic 1: Tenant Improvements, Building Renovations and Additions (Enlargements)1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate the requirements for building renovations or additions (enlargement) as required by the codes and standards of the jurisdiction.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate a proposed tenant improvement or change in occupancy classification, including:
 - Distinguishing between repairs, renovations, and remodels
 - Determining the occupancy classification of the proposed use
 - Evaluating compliance with new code for proposed height and area
 - Evaluating compliance with new code for proposed new occupancy classification
 - Ensuring new addition does not make existing building illegal
 - Determining extent of upgrade to current code for existing building
 - Evaluating speculative buildings and tenant improvements
 - Shell building design
 - Tenant build out
 - Tenant improvement for unknown occupant
 - Completing the building record updates

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 2: Damaged Building Repair0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate the requirements for determining damage repair if necessary and the process for application to repair or restore a building to its use.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate the requirements for determining damage repair if necessary and the process for application to repair or restore a building to its use, including:
 - Determining the need for a permit
 - Determining the extent of damage and a course of action for the repair
 - Determining if repair can be based on the code in effect at the time the building was originally constructed
 - Determining the amount of the existing building that will require upgrade to current code

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 3: Historic Building Conversions1:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate the requirements for historic buildings under repair or renovation.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate the requirements for historic buildings under repair or renovation, including:
 - Determining the historic designation/registry/eligibility
 - Applying historic building codes or special considerations
 - Determining the extent of compliance with current code
 - Evaluating sprinkler protection in lieu of compliance with code
 - Considering implications of a change of use

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 4: Tents and Membrane Structures1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate the requirements for tents and membrane structures as required by the codes and standards of the jurisdiction.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate the requirements for tents and membrane structures, including:
 - Defining tents and membrane structures
 - Determining if the tent or membrane structure will be temporary or permanent
 - Identifying the applicable codes that regulate tents and membrane structures
 - Requirement for a permit
 - Proximity to adjacent buildings
 - Type of construction, flame-resistance of materials
 - Allowable area
 - Sprinkler protection
 - Power, lighting, heating and cooking considerations
 - Fire department access

- Seating arrangements for assembly occupancies
- Means of egress

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 5: Demolition and Fire Safety During Construction.....0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate the requirements for demolition and fire safety during construction.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate the requirements for demolition and fire safety during construction, including:
 - Determining proper use of temporary heating appliances:
 - Oil-fired heaters
 - LP-gas heaters
 - Refueling
 - Installation
 - Supervision
 - Evaluating proposed precautions against fire:
 - Smoking
 - Waste disposal
 - Open burning
 - Spontaneous ignition
 - Fire watch
 - Cutting and welding
 - Temporary wiring for electrical power
 - Determining proper storage and handling of hazardous materials:
 - Storage, use, and handling of flammable and combustible liquids
 - Housekeeping in flammable and combustible liquid storage areas
 - Sources of ignition and smoking
 - Handling at point of final use
 - Leakage and spills
 - Storage and handling of explosive materials
 - Demolition using explosives
 - Reviewing the owner's responsibility for fire protection:
 - Program superintendent
 - Prefire plans
 - Training
 - Fire protection devices
 - Hot work operations
 - Impairment of fire protection systems
 - Temporary covering of fire protection devices
 - Reviewing provisions for other fire safety during construction issues:
 - Fire reporting
 - Fire department access to construction site
 - Maintenance of means of egress
 - Required stairways
 - Water supply for fire protection
 - Standpipes during construction

Discussion Questions

1. [text]

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Summative Testing	1:00
Formative Testing.....	2:00



Course: Plan Review of Fire Protection Equipment and Systems
Hours: ##.## (= instruction / 3:00 = testing)
Designed For: [text]
Description: [text]
Prerequisites: [text]
Passing Criteria: 80%
Certification: [text]
Class Size: [text]
Restrictions: [text]

CFSTE

REQUIRED STUDENT MATERIALS	EDITION	VENDORS
▪		
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▪		
REQUIRED INSTRUCTOR MATERIALS	EDITION	VENDORS
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VENDORS		
SFT	State Fire Training Bookstore (916-445-8158)	http://sft.fire.ca.gov

PLAN REVIEW OF FIRE PROTECTION EQUIPMENT AND SYSTEMS COURSE SYLLABUS

Course Objectives: to provide the student with...

- a) Text
- b) Text
- c) Text

Course Content ##.##

Unit 1: Introduction

Topic 1: Orientation and Administration 1:00
Terminal Learning Objective (TLO): At the end of this topic, the student will be able to
Enabling Learning Objectives (ELO):
[text]
Discussion Questions
1. [text]
Activities
1. [text]
Evaluation: Formative Test, Summative Test

Unit 2: Evaluating Fire Protection System Plans (CTS: 2-7)

Topic 1: Terminology and Components ##.##
Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define terminology and components related to fire protection system plans and identify basic facts about

reviewing fire protection system plans.

Enabling Learning Objectives (ELO):

1. Define terminology and components, including:
 - Building communication systems
 - Elevator systems
 - Fire alarm systems
 - Fire control rooms
 - Fire pumps
 - Fire standpipe systems
 - Fire suppression systems
 - Special extinguishing systems
2. Identify basic facts about reviewing fire protection systems plans, including:
 - A plans examiner spend the majority of his or her time reviewing fire protection systems plans
 - Include a broad range of complex systems
 - A plans examiner must be familiar with the purpose, design and function of each system type
 - Checklists can assist in the review process

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 2: Automatic Fire Sprinkler Systems.....#:#:

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify components of automatic fire sprinkler systems, occupancies that require them, occupancy hazard classifications, and special requirements; and describe installation standards, sprinkler system types, the hydraulic design method, and the pipe-schedule design method.

Enabling Learning Objectives (ELO):

1. Identify components of an automatic fire sprinkler system, including:
 - Water supply
 - Control valves
 - Supervisory devices
 - Distribution piping
 - Alarm devices
 - Sprinklers
2. Describe installation standards, including:
 - CBC Section 903
 - NFPA 13 Installation of Sprinkler Systems, with California amendments
 - NFPA 13D Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes
 - NFPA 13R Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in Height
 - Exempt locations (CBC Section 903.3.1.1.1)
3. Identify the occupancies that require automatic sprinkler systems, including:
 - Group A
 - Group E
 - Group F-1
 - Group H
 - Group I
 - Group L
 - Group M

- Group R
 - Group S
 - Other hazards and special conditions, including:
 - Woodworking operations
 - Cellulose nitrate film or pyroxylin plastics storage
 - High-piled storage
 - Repair garages
 - Bulk storage of tires
 - Commercial parking garages
 - Windowless buildings/stories
 - Rubbish and linen chutes
 - Buildings 55 feet or more in height
 - Ducts conveying hazardous exhausts
 - Commercial cooking operations
 - Motion picture and television production studio sound stages, approved production facilities and production locations.
 - High-rise buildings
 - Atriums
 - Underground structures
 - Stages
 - Special amusement buildings
 - Aircraft hangars
 - Flammable finishes
 - Drying rooms
 - Unlimited area buildings
 - Incidental use areas
 - Smoke-protected assembly seating
 - Horse-racing stables
 - Pet kennels
 - Public libraries
 - Fixed guideway transit systems
4. Identify occupancy hazard classifications, including:
- Light hazard occupancies
 - Ordinary hazard occupancies
 - Group I
 - Group II
 - Extra hazard occupancies
 - Group I
 - Group II
5. Describe types of sprinkler systems:
- Wet pipe systems
 - Dry pipe systems
 - Deluge system
 - Preaction systems
 - Combination dry pipe and preaction systems
 - Antifreeze systems
 - Outside sprinklers for exposure protection
 - Refrigerated spaces
6. Describe the hydraulic design method:
- More economical selection of pipe sizes
 - Design density (gpm/ft²) based on severity of hazard classification

- Pipe size determined by cumulative flow and pressure loss
 - Area of sprinkler operation (design area) and design curves
 - Hydraulically most remote area
 - Sprinkler orifice size and K-factors
 - Influence of special sprinklers with increase orifice sizes
7. Describe the pipe-schedule design method:
- Mostly used for modification to existing systems
 - Pipe size determined by number of sprinklers being supplied based on occupancy classification
 - Minimum head end pressure is assumed
 - New systems limited to 5,000 sq ft or less
8. Identify special requirements, including:
- Quick-response and residential sprinklers (CFC Section 903.3.2)
 - Obstructed locations (CFC Section 903.3.3)
 - Actuation (CFC Section 903.3.4)
 - Water supplies (CFC Section 903.3.5)
 - Hose threads (CFC Section 903.3.6)

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 3: Evaluating Automatic Fire Sprinkler Systems###

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate automatic fire sprinkler system plans by describing the information required on plans, water supply capacity information sheets, and hydraulic calculation forms, and evaluating underground piping and water supply, system components and hardware, system-specific requirements, and system piping hanging, bracing, and restraints.

Enabling Learning Objectives (ELO):

1. Describe the information required on plans (NFPA 13 Section 14.1.3)
2. Describe the information required on water supply capacity information sheets (NFPA 13 Section 14.2.1)
3. Describe the information required on hydraulic calculation forms (NFPA 13 Section 14.3.1)
4. Describe underground piping and water supply, including:
 - Water supply
 - Number of supplies
 - Size of fire mains
 - Water supply treatment
 - Connection between underground and aboveground piping
 - Connection passing through or under foundation walls
 - Meters
 - Connection from waterworks system
 - Water supply types
 - Public utility water works systems
 - Pumps
 - Pressure tanks
 - Gravity tanks
 - Penstocks or flumes, rivers, or lakes
 - Underground piping
 - Piping materials
 - Fittings

- Joining of pipe and fittings
 - Depth of cover
 - Protection against freezing
 - Protection against damage
 - Requirement for laying pipe
 - Joint restraint
 - Backfilling
 - Testing and acceptance
5. Describe system components and hardware, including:
- Sprinklers
 - Sprinkler identification
 - Sprinkler discharge characteristics
 - Occupancy limitations specific to sprinklers
 - Temperature characteristics
 - Special coatings
 - Escutcheons and cover plates
 - Guards and shields
 - Stock of spare sprinklers
 - Aboveground pipe and tube
 - Steel pipe: welded or roll-grooved
 - Steel pipe: threaded
 - Specially listed steel pipe
 - Copper tube
 - Listed pipe and tubing
 - Pipe bending
 - Pipe identification
 - Fittings
 - Fitting pressure limits
 - Couplings and unions
 - Reducers and bushings
 - Threaded pipe and fittings
 - Welded pipe and fittings
 - Groove joined fittings
 - Brazed and soldered fittings
 - Valves
 - Valve pressure requirements
 - Listed indicating valves
 - Wafer-type valves
 - Drain valves and test valves
 - Identification of valves
 - Fire department connections
 - Water flow alarms
6. Describe system-specific requirements, including:
- Wet pipe systems
 - Pressure gauges
 - Relief valves
 - Dry pipe systems
 - Pressure gauges
 - Allowable sprinkler types
 - Size of systems - volume limitations
 - Quick-opening devices

- Location and protection of dry pipe valve
 - Air pressure and supply
 - Pre-action systems and deluge systems
 - Pressure gauges
 - Location and spacing of detection devices
 - Devices for test purposes and testing apparatus
 - Location and protection of system water control valves
 - Size of systems
 - Supervision
 - System configuration
 - Combined dry pipe and pre-action systems
 - Dry pipe valves in combined systems
 - Exhausters
 - Subdivision of system using check valves
 - Time limitation
 - Antifreeze systems
 - Antifreeze solutions
 - Arrangement of supply piping and valves
 - Outside sprinklers for protection against exposure fires
 - Water supply and control
 - Controls
 - Drain valves
 - Check valves
 - System arrangement
 - Pipe and fittings
 - Strainers
 - Gauge connections
 - Sprinklers
 - Refrigerated spaces
 - Spaces maintained at temperatures above 32°F
 - Spaces maintained at temperatures below 32°F
 - Low air pressure alarm
 - Piping pitch
 - Air or nitrogen supply
7. Describe hanging, bracing, and restraint of system piping, including:
- Hangers
 - Listing
 - Component material
 - Trapeze hangers
 - Support of non-system components
 - Hanger rods
 - Fasteners in concrete
 - Fasteners in steel
 - Fasteners in wood
 - Installation of pipe hangers
 - Maximum distance between hangers
 - Location of hangers on branch lines
 - Minimum number of hangers
 - Clearance to hangers
 - Unsupported lengths of pipe
 - Unsupported armovers

- Location of hangers on mains
- Support of risers
- Protection of piping against damage where subject to earthquakes
 - Couplings
 - Seismic separation assembly
 - clearance
 - Sway bracing
 - Lateral sway bracing
 - Longitudinal sway bracing
 - Risers
 - Horizontal force factors
 - Horizontal loads
 - Fasteners
 - Sway bracing assemblies
 - Attachments
 - Braces to buildings with differential movement
 - Restraint of branch lines
- Hangers and fasteners subject to earthquakes

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 4: Standpipe Systems.....###

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify standpipe classifications, types, and installation requirements, the structures and occupancies that require standpipe systems, the location of Class I, II, and III standpipe hose connections, and other standpipe system considerations.

Enabling Learning Objectives (ELO):

1. Identify installation requirements, including:
 - CBC Section 905
 - NFPA 14 Installation of Standpipe and Hose System, with California amendments
2. Identify standpipe classification, including:
 - Class I
 - Class II
 - Class III
3. Identify standpipe types, including:
 - Automatic dry
 - Automatic wet
 - Manual dry
 - Manual wet
 - Semiautomatic dry
4. Identify structures and occupancies that require standpipe systems, including:
 - Class III standpipe systems required where the floor level is more than 30 ft above or below the lowest level of fire department vehicle access
 - Group A occupancies
 - Covered mall buildings
 - Stages
 - Underground buildings
 - Helistops and heliports

- Marinas and boatyards
 - Smoke-proof enclosures
 - Group I-3 occupancies
 - Fixed guide-way transit systems
5. Identify the location of Class I standpipe hose connections:
 - In every required stairway
 - Horizontal exits
 - In every exit passageway
 - In covered mall buildings
 - Roofs
 - Where more than 150 feet from a hose connection; 200 feet in sprinklered buildings
 6. Identify the location of Class II standpipe hose connections:
 - Group A-1 and A-2 occupancies with occupant loads of more than 1,000
 - Class II system 1-inch hose and listed variable stream fog nozzle
 7. Identify the location of Class III standpipe hose connections:
 - As required for Class I standpipes and Class II hose connections
 8. Identify other standpipe system considerations, including:
 - Protection of risers and laterals
 - Interconnection of standpipes
 - Cabinets
 - Permissible locations for dry standpipes
 - Valve supervision
 - Pressure-regulating devices
 - Standpipe systems required during construction and demolition operations

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 5: Fire Alarm System Functions and Components###

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe the functions of a fire alarm including notification, supervisory, and trouble conditions, alerting occupants, summoning aid and fire safety control, and describe the components of a fire alarm system including initiating devices, initiating device circuits, signaling device circuits, notification appliances, fire alarm control units or panels, primary and secondary power supplies, auxiliary device circuits, supervisory circuits, trouble signals, supplemental equipment, and fire safety functions.

Enabling Learning Objectives (ELO):

1. Describe the function of alarm notification, supervisory, and trouble conditions, including:
 - Detection of heat, smoke or other products of combustion
 - Manual activation of alarm
 - Activation of sprinkler or other fire suppression system
 - Abnormal condition of a valve, pressure switch, circuit, etc.
2. Describe the function of alerting occupants, including:
 - Audible notification (bells, horns, chimes, speakers, etc.)
 - Visual notification (strobes, lights, annunciators, etc.)
3. Describe the function of summoning aid from firefighting forces, including:
 - Signal transmitted to central station, proprietary station or directly to the fire department
4. Describe the function of fire safety control functions, including:
 - Closing doors
 - Recalling elevators

- Unlocking doors
- Activating extinguishing systems
- Starting or stopping air moving equipment
- 5. Describe initiating devices, including:
 - A system component that originates transmission of a "change-of-state" condition, such as in a smoke detector, manual fire alarm box, or supervisory switch
 - Manual stations
 - Smoke detectors
 - Duct detectors
 - Heat detectors
 - Water flow devices
 - Flame detectors
 - Projected beam detectors
 - Aspirated smoke detectors
 - Suppression system release
 - Cameras
- 6. Describe initiating device circuits:
 - A circuit to which automatic or manual initiating devices are connected where the signal received does not identify the individual device operated
- 7. Describe signaling device circuits:
 - A circuit or path between any combination of circuit interfaces, control units, or transmitters over which multiple system input signals or output signals, or both, are carried in both directions
 - A fire alarm system component with discrete identification that can have its status individually identified or that is used to individually control other functions (addressable)
- 8. Describe notification appliances:
 - A fire alarm system component such as a bell, horn, speaker, light, or text display that provides audible, tactile, or visible outputs, or any combination thereof
 - Bells
 - Horns
 - Buzzers
 - Chimes
 - Speakers
 - Strobes
 - Lamps
- 9. Describe fire alarm control units or panels:
 - Brain of the system
 - Powers system
 - Electrically monitors circuits
 - Receives signals from initiating devices
 - Activates alarm notification appliances
 - Activates fire safety functions and supplementary equipment
 - Notifies fire department
- 10. Describe primary power supplies
- 11. Describe secondary power supplies
- 12. Describe auxiliary device circuits
- 13. Describe supervisory circuits:
 - Valve monitoring (tamper) switches
 - Air pressure switches
 - Water level switches
- 14. Describe trouble signals:
 - A signal initiated by a system or device indicative of a fault in a monitored circuit, system, or

- component
 - Capable of identifying when a single open or a single ground occurs
 - Class B circuits
 - Initiating device circuits
 - "Two-wire" Class B
 - Capable of identifying when a single open or a single ground occurs
 - Trouble signal activates
 - Signaling line circuits
 - "Two-wire" Class B
 - Style 4
 - Capable of identifying a single open, a single ground or a wire-to-wire short
 - Trouble signal activates
 - Notification Appliance Circuits
 - "Two-wire" Class B
 - Capable of identifying a single open, a single ground or a wire-to-wire short
 - Trouble signal activates
 - Class A circuits
 - Initiating device circuits
 - "Four-wire" Class A
 - Capable of performing when a single open or a single ground occurs
 - Trouble signal activates
 - Signaling line circuits
 - "Four-wire" Class A
 - Style 6 or 7
 - Capable of performing when a single open, a single ground or a wire-to-wire short occurs
 - Trouble signal activates
 - Notification appliance circuits
 - "Four-wire" Class A
 - Capable of performing when a single open, a single ground or a wire-to-wire short occurs
 - Trouble signal activates
15. Describe supplemental equipment:
- Annunciators
 - Remote operator control panels
 - Printers
 - Graphic video interface
16. Describe fire safety functions:
- Close fire doors
 - Close fire dampers
 - Shut down or start fans
 - Recall elevators
 - Release fire suppression agents
 - Turn on egress lighting
 - Summon fire department

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 6: Evaluating Fire Alarm System Plans###

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe the occupancies that require fire alarm systems, including:

- Group A
 - Occupant load of 300 or more
 - System initiation in an occupant load of 1,000 or more
- Group B
 - Occupant load of 500 or more
 - More than 100 persons above or below the lowest level of exit discharge
- Group C
- Group E
 - Occupant load of 50 or more
 - Containing more than one classroom
 - One or more rooms used for day care purposes
- Group F
 - Two or more stories in height with an occupant load of 500 or more above or below the lowest level of exit discharge
- Group H
 - Group H-5 occupancies
 - Occupancies used for the manufacture of organic coatings
 - Highly toxic gases, organic peroxides, and oxidizers storage, use or handling
- Group I
- Group L
- Group M
 - Occupant load of 500 or more persons
 - More than 100 persons above or below the lowest level of exit discharge
- Group R
 - Group R-1 and R-4 occupancies
 - Group R-2 occupancies
 - Any dwelling unit or sleeping unit is located three or more stories above the lowest level of exit discharge
 - Any dwelling unit or sleeping unit is located more than one story below the highest level of exit discharge of exits serving the dwelling unit or sleeping unit
 - The building contains more than 16 dwelling units or sleeping units.
 - Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-3.1, R-4 and I-1, regardless of occupant load
- Special amusement buildings
- High-rise buildings
- Atriums connecting more than two stories
- High-piled combustible storage areas
- Delayed egress locks
- Aerosol storage uses
- Lumber, wood structural panel, and veneer mills
- Underground buildings with a smoke exhaust system
- Underground buildings
- Covered mall buildings
- Residential aircraft hangars
- Airport traffic control towers

- Battery rooms
 - Motion picture and television production studio sound stages and approved production facilities
 - Fixed guideway transits systems
 - Winery caves
2. Describe construction documents for fire alarm systems shall be submitted for review and approval prior to system installation, including, but not limited to:
- A floor plan indicating the use of all rooms
 - Locations of alarm-initiating and notification appliances
 - Alarm control and trouble signaling equipment
 - Annunciation
 - Power connection
 - Battery calculations
 - Conductor type and sizes
 - Voltage drop calculations
 - Manufacturers, model numbers, and listing information for equipment, devices and materials
 - Details of ceiling height and construction
 - The interface of fire safety control functions
3. Describe the location of alarm initiating devices, including:
- Manual fire alarm boxes
 - Location
 - Height
 - Color
 - Signs
 - Operation
 - Protective covers
 - Smoke and heat detectors
 - Detector coverage
 - Total (complete) coverage
 - Partial or selective coverage
 - Non-required Coverage
 - Heat detectors
 - Temperature classification
 - Location
 - Spacing
 - Smoke detectors
 - Sensitivity
 - Location
 - Spacing
 - Special considerations
 - Video imaging smoke detection
 - Radiant energy fire detection
 - Combination, multi-criteria, and multi-sensor detectors
 - Other fire detectors
 - Sprinkler water flow alarm-initiating devices
 - Other automatic extinguishing systems alarm-initiating devices
 - Fire extinguisher monitoring device
 - Supervisory signal-initiating devices
 - Control valve supervisory signal-initiating device
 - Pressure supervisory signal-initiating device
 - Water level supervisory signal-initiating device
 - Water temperature supervisory signal-initiating device

- Room temperature supervisory signal-Initiating device
- Smoke detectors for control of smoke spread
 - Classifications
 - Limitations
 - Purposes
 - Area smoke detectors within smoke compartments
 - Smoke detection for the air duct system
 - Location and installation of detectors in air duct systems
 - Smoke detectors for door release service
- 4. Describe the location of notification appliances, including:
 - Audible characteristics
 - Public mode audible requirements
 - Private mode audible requirements
 - Sleeping area requirements
 - Narrow band tone signaling
 - Exit marking audible notification appliances
 - Location of audible notification appliances
 - Visible characteristics
 - Public mode
 - Private mode
 - Appliance location
 - Spacing in rooms
 - Spacing in corridors
 - Performance-based alternative
 - Sleeping areas
 - Supplementary visible signaling methods
 - Textual audible appliances
 - Speaker appliances
 - Telephone appliances
 - Textual visible appliances
 - Tactile appliances
 - Standard emergency service interface
 - Mass notification systems
- 5. Describe fire alarm control panel and annunciators, including:
 - Protection of the fire alarm system
 - Alarm annunciation
 - Supervisory and trouble annunciation
 - Annunciator access and location
 - Alarm annunciation display
 - Fire command center
 - Annunciation zoning
 - Monitoring integrity
- 6. Describe power supplies, including:
 - Primary Power Supply
 - Dedicated branch circuit
 - Mechanical protection
 - Overcurrent protection
 - Circuit breakers and engine stops
 - Secondary power supply
 - Storage battery
 - Marking

- Location
 - Capacity
 - Battery charging
 - Overcurrent protection
 - Metering
 - Charger supervision
 - Automatic starting, engine-driven generator serving the dedicated branch circuit
 - Performance, operation, testing, and maintenance
 - Capacity
 - Fuel
 - Battery and charger
 - Compatibility
 - Secondary power operation
 - Continuity of power supplies
 - Power supply for remotely-located control equipment
 - Battery calculations
 - Design considerations
 - How much current the system takes in the normal condition
 - How much current the system takes in the alarm condition
 - How long the system is required to run in the event of a normal power failure
 - Formula
 - $(\text{Total supervisory current} \times \text{supervisory time required}) + (\text{Total alarm current} \times \text{alarm time required}) = (\text{Total system battery requirement in amp/hours})$
 - Additional 10% safety factor common
 - Voltage drop calculation
 - Design consideration
 - As a circuit length increases, the voltage at the end of the circuit is reduced due to resistance in the cable
 - It is vital to ensure the voltage at last horn/strobe on the circuit is sufficient to ensure it will work when needed
 - Nothing in the codes and standards specify required starting voltage; designers need to ensure that the voltage at the last appliance on the circuit is at least the minimum required for operation of that appliance
 - Formula
 - $(\text{Device amp draw} \times \text{distance} \times \text{resistivity per circular mils of wire/circular mils}) = (\text{Voltage drop})$
 - $(\text{Voltage drop/system operation time in hours} \times 100) = (\text{percent voltage drop})$
 - Riser diagrams
 - Shows all devices, appliances, components, and equipment connected to the fire alarm control panel by symbols matching the symbol legend for each circuit
 - Identifies wire type, gauge, length and number of conductors in each circuit, or cable
 - Identifies zones when (or where) applicable
 - Identifies circuits by style for both initiating device and notification appliance circuits
 - Candela rating of each Visible Notification Appliance per UL Standard 1971 and
 - NFPA 72, Chapter 4
 - Electrical panel and circuit breaker supplying main power to FACP and subpanels
7. Describe fire safety control functions

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 7: Elevators###

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Identify requirements for automatic elevators, including:

- [text]

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 8: Fire Command Centers.....###

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe a fire command center, including:

- [text]

2. Describe and evaluate fire command center plans, including:

- [text]

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 9: Engineered and Pre-Engineered Fixed Extinguishing Systems###

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe and evaluate engineered and pre-engineered fixed extinguishing systems plans, including:

- [text]

2. Describe and evaluate the requirements for automatic fire suppression systems for kitchen cooking applications and hazardous locations, including:

- [text]

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 10: Smoke Control Systems.....###

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe and evaluate smoke migration and methods for interaction with smoke control or removal systems, including:

- [text]

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 11: Portable Fire Extinguishers	##
Terminal Learning Objective (TLO): At the end of this topic, the student will be able to	
Enabling Learning Objectives (ELO):	
1. Describe and evaluate requirements for portable fire extinguishers, including:	
• [text]	
Discussion Questions	
1. [text]	
Activities	
1. [text]	
Evaluation: Formative Test, Summative Test	

PE 2-8: Describe Evaluating Other Hazardous Processes and Operations Plans for Regulatory Compliance

1. Describe and evaluate a basic set of factual documents used during the review of hazardous materials processing and storage, including flammable and combustible liquids, solids, and gases
2. Describe and evaluate the requirements for exterior and interior manufacturing, processing, use, storage, handling, and dispensing of hazardous materials, including flammable and combustible liquids, solids, and gases
3. Describe and evaluate the requirements for the application of spraying and dipping of flammable and combustible liquids
4. Describe and evaluate the requirements for open and closed systems using hazardous materials including flammable and combustible liquids, solids, and gases
5. Describe and evaluate the terminology for identification and special marking for buildings/areas storing hazardous materials
6. Describe and evaluate hazardous materials storage as it relates to control areas
7. Describe and evaluate secondary containment for hazardous materials
8. Describe and evaluate medical and laboratory gas systems
9. Describe and evaluate refrigerant systems
10. Describe and evaluate alternative fuels used for motorized vehicles



Course: Plan Review of Architectural Features, Fire Operational Features, and Hazardous Materials

CFSTI

Hours: 00:00 (00:00 = instruction / 3:00 = testing)

Designed For: [text]

Description: [text]

Prerequisites: [text]

Passing Criteria: 80%

Certification: [text]

Class Size: [text]

Restrictions: [text]

REQUIRED STUDENT MATERIALS	EDITION	VENDORS
▪ Plans Examiner for Fire & Emergency Services	1 st Edition	IFSTA
▪ California Fire Code, Title 24 Part 9	2010 Edition	ICC
REQUIRED INSTRUCTOR MATERIALS	EDITION	VENDORS
▪ Plans Examiner for Fire & Emergency Services	1 st Edition	IFSTA
▪ California Fire Code, Title 24 Part 9	2010 Edition	ICC
VENDORS		
SFT	State Fire Training Bookstore (916-445-8158)	http://sft.fire.ca.gov

PLAN REVIEW OF ARCHITECTURAL FEATURES, FIRE OPERATIONAL FEATURES, AND HAZARDOUS MATERIALS COURSE SYLLABUS

Course Objectives: to provide the student with...

- a) Text
- b) Text
- c) Text

Course Content###

Unit 1: Introduction

Topic 1: Orientation and Administration###

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

[text]

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Unit 2: Reviewing Architectural and Structural Plans (CTS: 2-5)

Topic 1: Terminology and Symbols.....1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe relevant terminology and symbols, including:

- Structural loading types
- Live and dead loads
- Seismic loads
- Exterior elevation review for new buildings
- Load bearing
- Structural design
- Columns
- Beams
- Girders
- Trusses
- Primary/secondary structural members
- Structural framing

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 2: Occupancy and Construction Types1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe occupancy classifications consistent with the codes and standards of the jurisdiction, including:
 - 12 general occupancy groups:
 - Group A
 - Group B
 - Group C
 - Group E
 - Group F
 - Group H
 - Group I
 - Group L
 - Group M
 - Group R
 - Group S
 - Group U
 - Many of these groups are divided into subgroups
2. Describe construction types consistent with the codes and standards of the jurisdiction, including:
 - Five construction types
 - Type I
 - Type II
 - Type III
 - Type IV
 - Type V
 - Combustible vs. noncombustible construction
 - Fire-resistive vs. non-rated construction
3. Describe incidental use areas consistent with the codes and standards of the jurisdiction, including:
 - Furnace rooms
 - Boiler rooms

- Refrigerant machinery rooms
- Parking garages
- Hydrogen cut-off rooms,
- Incinerator rooms
- Paint shops
- Rooms or areas with special hazards such as laboratories and vocational shops
- Laundry rooms over 100 square feet
- Storage rooms over 100 square feet
- Waste and linen collection rooms
- Stationary storage battery systems
- Fire separation and/or fire-extinguishing system protection

Discussion Questions

1. What ancillary spaces would not change the overall occupancy or use of a building or area?

Activities

1. Complete a worksheet matching uses to occupancy.

Evaluation: Formative Test, Summative Test

Topic 3: Allowable Height and Area and Property Location4:00

Terminal Learning Objective (TLO): **At the end of this topic, the student will be able to** describe how to determine the maximum allowable floor area and the maximum height and stories of a building and determine the proper location of the building on the property consistent with the codes and standards of the jurisdiction

Enabling Learning Objectives (ELO):

1. Describe and evaluate how to determine the maximum allowable floor area and the maximum number of stories and height of a building, including:
 - Determining allowable height permitted for both "feet" and "stories"
 - Determining if mezzanine provisions are applicable
 - Determining if rooftop structures are in compliance
 - Determining if building qualifies as an unlimited area building
 - Determining maximum allowable area permitted for building and each story
 - Single-occupancy building
 - Multi-occupancy with accessory occupancies
 - Multi-occupancy building with non-separated occupancies
 - Multi-occupancy building with separated occupancies
 - Use of fire walls
 - Determining if special provisions are to be applied for height or area
 - Verifying the type of materials and degree of fire resistance for the building's major elements
2. Describe and evaluate the impacts of automatic fire sprinkler systems installed throughout, including:
 - Allowable area increase
 - Means of egress trade-offs
 - Building height and story increase
 - One-hour construction substitution
 - Unlimited area buildings
3. Describe and evaluate the proper location of a building on a project site, including:
 - Determining the number of buildings on the site
 - Evaluated as a single building or multiple buildings
 - Type of construction differences and requirements
 - Determining minimum requirement fire rating of exterior walls
 - Fire separation distance

- Measured from the building to:
 - Lot line
 - Center line of a public way
 - Imaginary assumed line between two buildings on the same lot
- Determining exterior opening protection requirements
- Determining frontage increase for allowable area purposes

Discussion Questions

1. [text]

Activities

1. Complete a worksheet which utilizes Table 503 of the California Building Code.

Evaluation: Formative Test, Summative Test

Topic 4: Special Detailed Occupancy Requirements.....3:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify and evaluate the extent of any special detailed occupancy requirements applicable to the project consistent with the codes and standards of the jurisdiction

Enabling Learning Objectives (ELO):

1. Identify and evaluate the extent of any special detailed occupancy requirements applicable to a project, including:
 - Covered mall buildings
 - High-rise buildings
 - Atriums
 - Motor-vehicle-related occupancies
 - Group I-2 and I-3 occupancies
 - Group H occupancies

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 5: Means of Egress3:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe and evaluate the maximum allowable occupant loading and the means of egress consistent with the codes and standards of the jurisdiction

Enabling Learning Objectives (ELO):

1. Describe the critical definitions specific to the means of egress, including:
 - Means of egress
 - Exit access
 - Exit
 - Exit discharge
 - Accessible means of egress
 - Aisle
 - Area of refuge
 - Common path of egress travel
 - Corridor
 - Egress court
 - Horizontal exit
 - Exit enclosure
 - Exit passageway

- Floor area, net vs. gross
 - Public way
 - Smoke-protected assembly seating
 - Stairway, interior vs. exterior
2. Describe and evaluate the maximum allowable occupant loading consistent with the codes and standards of the jurisdiction, including:
- Design occupant load
 - Areas with fixed seating
 - Areas without fixed seating
 - Increased occupant load
 - Posting of occupant load
 - Exiting from multiple levels and egress convergence
 - Outdoor areas
 - Multiple occupancies
3. Describe and evaluate egress elements consistent with the codes and standards of the jurisdiction, including:
- Egress width and distribution
 - Emergency lighting
 - Accessible means of egress
 - Door swing
 - Door operations, locks, and latches
 - Panic hardware
 - Stairway width
 - Stairway treads and risers
 - Exit signs: visual and tactile
 - Stairway and ramp handrails
 - Guards
 - Egress through intervening spaces
 - Common path of egress travel
 - Number of exit or exit access doorways
 - Egress separation
 - Travel distance
 - Corridor construction
 - Number of exits
 - Vertical exit enclosures
 - Exit passageways
 - Horizontal exits
 - Exterior exit stairways
 - Exit discharge
 - Egress from assembly occupancies

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 6: Fire-Resistance-Rated Construction.....2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe and evaluate elements of fire protection features of building systems as required by the codes and standards of the jurisdiction

Enabling Learning Objectives (ELO):

1. Describe and evaluate elements of fire protection features of building systems as required by the codes and standards of the jurisdiction, including:
 - Fire barriers
 - Fire walls
 - Exterior walls
 - Smoke barriers
 - Smoke partitions
 - Shaft enclosures
 - Horizontal assemblies
 - Fire protection for structural members
 - Opening protectives
 - Ducts and air transfer openings
2. Describe and evaluate elements of construction for projects within a wildland urban interface area when required by codes, standards, and ordinances, and policies of the jurisdiction, including:
 - Ignition-resistant construction
 - Roofing
 - Vents
 - Exterior wall coverings
 - Exterior doors and windows

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 7: Interior Finishes 1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify and evaluate materials utilized as interior floor, wall and ceiling finishes as required by the codes and standards of the jurisdiction

Enabling Learning Objectives (ELO):

1. Identify and evaluate the flame spread and smoke development characteristics and classifications of interior materials used for interior finishes, including:
 - Flame spread and smoke development index
 - Class A materials
 - Class B materials
 - Class C materials
 - Unclassified materials
 - Reduction of classification where sprinkler protection is provided
2. Identify and evaluate the interior wall and ceiling finish requirements by occupancy, including:
 - Verifying compliance of wall and ceiling finishes
 - Verifying compliance of floor finishes
3. Identify and evaluate the combustible materials permitted in Types I and II construction
4. Identify and evaluate requirements for decorative materials and trim

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 8: Fire Protection Systems.....1:30

Terminal Learning Objective (TLO): **At the end of this topic, the student will be able to** identify and evaluate materials utilized as interior floor, wall and ceiling finishes as required by the codes and standards of the jurisdiction

Enabling Learning Objectives (ELO):

1. Identify additional fire protection systems that may be required by the codes and standards of the jurisdiction
2. Describe how to determine compliance with fire alarm provisions
 - Based on specific occupancy, use, or type of building
 - Occupancy group
 - Special amusement buildings
 - High rise buildings
 - Atriums
 - High-piled combustible storage areas
 - Delayed egress locks
 - Aerosol storage uses
 - Lumber, wood structural panel, and veneer mills
 - Underground buildings
 - Residential aircraft hangars
 - Airport traffic control towers
 - Battery rooms
 - Motion picture and television production studio sound stages
 - Fixed guide-way transits systems
 - Automatic fire detection devices
 - Manual fire alarm boxes
 - Location
 - Height
 - Color
 - Signs
 - Operation
 - Protective covers
 - Power supply
 - Wiring
 - Activation
 - Pre-signal systems
 - Zoning
 - Annunciation
 - Alarm notification
 - Visual alarms
 - Audible alarms
 - Emergency voice/alarm communication systems
 - Fire department communication system
 - Fire safety functions
 - Duct smoke detection
 - Access to devices
 - Fire-extinguishing systems
 - Alarm monitoring
3. Describe how to determine compliance with standpipe systems, including:
 - Standpipe systems classification
 - Class I

- Class II
 - Class III
 - Combined standpipes
 - Standpipe systems types
 - Automatic dry
 - Automatic wet
 - Manual dry
 - Manual wet
 - Semiautomatic dry
 - Required installations
 - Building height
 - Group A occupancies
 - Covered mall buildings
 - Stages
 - Underground buildings
 - Heliports and helistops
 - Marinas and boatyards
 - Smoke-proof enclosures
 - Group I-3 occupancies
 - Standpipe locations
 - Cabinets
 - Valve supervision
 - Temporary standpipes during construction
4. Describe how to determine compliance with fire extinguisher placement
- Fire extinguisher classification
 - Class A
 - Class B
 - Class C
 - Class D
 - Class K
 - Location
 - Conspicuous
 - Unobstructed and unobscured
 - Maximum travel distance to extinguisher
 - Special hazards
 - Size and distribution
 - Hangers and brackets
 - Cabinets
 - Height above floor
 - Wheeled extinguishers
5. Describe how to determine compliance with alternative fire extinguishing systems
- Wet chemical systems
 - Dry chemical systems
 - Foam systems
 - Carbon dioxide systems
 - Halon systems
 - Clean-agent systems
 - Commercial cooking systems

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 9: Special Use Features and Other Building Elements3:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify and evaluate materials utilized as interior floor, wall and ceiling finishes as required by the codes and standards of the jurisdiction

Enabling Learning Objectives (ELO):

1. Identify and evaluate any special use features of the building as required by the codes and standards of the jurisdiction, including:
 - Stages and platforms
 - Combustible storage
 - Hazardous materials
 - Application of flammable finishes
2. Identify roof assembly, roof covering, and roof structure requirements as required by the codes and standards of the jurisdiction, including:
 - Roof covering fire classification
 - Class A
 - Class B
 - Class C
 - Non-classified roofing
 - Noncombustible roofing
 - Minimum roof covering based on the type of construction of the building
 - Roof coverings within very high fire hazard severity zones
 - Roof coverings within state responsibility areas
 - Roof coverings within all other areas
 - Roofing requirements in a wildland urban interface fire area
 - Rooftop structures
 - Height above roof
 - Area limitations of penthouses and other roof structures
 - Use limitations of penthouses and other roof structures
 - Construction limitations of penthouses and other roof structures
3. Identify and determine compliance of other miscellaneous provisions as required by the codes and standards of the jurisdiction, including:
 - Safety glazing provided in hazardous locations
 - Indoors
 - Adjacent to doors
 - Large panels
 - Adjacent to stairways and landings
 - Combustible wall coverings on the exterior side of exterior walls
 - Glass and glazing
 - Gypsum board and plaster
 - Plastic
 - Elevators
 - Special construction
 - Membrane structures
 - Temporary structures
 - Pedestrian walkways and tunnels
 - Awnings and canopies

- Marquees
- Signs
- Swimming pool enclosures
- Encroachment into the public right-of-way
 - Encroachments below grade
 - Encroachments above grade and below eight feet in height
 - Encroachments eight feet or more above grade
 - Temporary encroachments
- Safeguards during construction
 - Construction safeguards
 - Demolition
 - Site work
 - Pedestrian protection
 - Temporary use of streets, alleys, and public property
 - Fire extinguishers
 - Exits
 - Standpipes
 - Automatic sprinkler systems

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Unit 3: Evaluating Mechanical, Plumbing, And Electrical Plans (CTS: 2-6)

Topic 1: Electrical Plan Review 3:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe relevant terminology, symbols and components of an electrical distribution system as required by the codes and standards of the jurisdiction.

Enabling Learning Objectives (ELO):

1. Describe relevant terminology and symbols, including:
 1. Theory of electricity
 - Types of electricity
 - Fundamental properties
 - Voltage (volts)
 - Current (amps)
 - Resistance (ohms)
 - Power (watts)
 - Wiring conventions
 - Electrical service
 - Power lines
 - Service connections
 - System voltage
 - Transformers
 - Electrical system components
 - Special considerations
 - Emergency systems
 2. Describe and evaluate fire protection interface of the electrical system, including:
 - Electrical service

- Transformers
- Electrical switchgear and panel rooms
- Egress lighting: normal and emergency
- Signal systems, communication and information technology
- Fire alarm power supplies
- Exit signs
- Emergency power systems and generators
 - Basic generators
 - Emergency power supplies and systems
 - Stored electrical energy power systems
 - Emergency and exit illumination
- Photovoltaic systems
- Hazardous locations electrical equipment
 - Class I and Class II equipment and wiring
 - Conduit seals
 - Temperature codes
 - Grounding wires
 - Static protection
 - Lightning protection
- Interlocks
- Shunt-trip breakers

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 2: Mechanical and Plumbing Plan Review3:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe the pertinent components of a heating, ventilation and air conditioning systems as required by the codes and standards of the jurisdiction

Enabling Learning Objectives (ELO):

1. Describe the pertinent components of heating, ventilation, and air conditioning systems, including:
 - HVAC and corresponding ductwork
 - Hydronics piping systems
 - Wall penetrations
 - Air balance and pressure differential relationships
 - HVAC shutdown
 - Exhaust systems
 - Cooking equipment
 - Painting operations
 - Fume hoods
 - Hazardous material storage areas
 - Dust collection system
 - Explosion venting
 - Combustion air openings and ductwork
 - Industrial ventilation
 - Water treatment facilities
 - Refrigeration systems
 - Ductwork penetration of walls and floors

- Chimneys and hearths
 - Fire and smoke dampers
 - Interlocks
 - Smoke control
 - Smoke evacuation (removal)
2. Describe the pertinent components of a plumbing and gas systems, including:
- Fuel gas systems
 - Storage tanks
 - Piping
 - Meters
 - Regulators
 - Vents
 - Backflow prevention
 - Low-pressure protection
 - Shut-off valves
 - Appliances
 - Water supply piping and shutoffs
 - Drainage systems and vents
 - Pumps
 - Specialized piping
 - Flammable and combustible liquids piping
 - Compressed gas piping
 - Air
 - Nitrogen
 - Carbon dioxide
 - Medical gas piping
 - Oxygen
 - Nitrous oxide
 - Medical air
 - HPM gas piping
 - Water used in various processes

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 3: Penetration of Fire-Resistance-Rated Construction1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe and evaluate through-stop and fire-stop penetration protection for building utilities as required by the codes and standards of the jurisdiction

Enabling Learning Objectives (ELO):

1. Describe and evaluate through-stop and fire-stop penetration protection for building utilities and materials, including:
- Penetrations of fire-resistance-rated walls
 - Penetrations of fire-resistance-rated floors
 - Penetrations of non-fire-resistance-rated floors
 - Through penetrations
 - Standards
 - "F" rating

- "T" rating
- "L" rating
- Membrane penetrations
- Ducts and air transfer openings without dampers

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Unit 4: Hazardous Materials Processing and Storage (CTS: 2-8)

Topic 1: Terminology and Special Markings for Hazardous Materials Storage1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Identify hazardous material hazardous categories and classifications in accordance with Appendix E
2. Identify Material Safety Data Sheet(s) (MSDS)
3. Describe and evaluate a Hazardous Materials Inventory Statement (HMIS)
4. Describe and evaluate a Hazardous Materials Management Plan (HMMP)
5. Identify and describe an Area Business Plan in accordance with California Health & Safety Code Chapter 6.95
6. Describe and evaluate the need, requirement, and placement of NFPA 704 diamond placards in accordance with the California Fire Code
7. Identify the requirements for labeling storage cabinets in accordance with the California Fire Code
8. Identify the requirements for "No Smoking Signs" in accordance with the California Fire Code

Discussion Questions

1. What is Certified Unified Program Agency (CUPA) and how does the fire service interact with CUPA?

Activities

1. Given an HMIS and various MSDS, complete a worksheet assigning appropriate NFPA 704 diamond numeric values for various buildings storing or using multiple hazardous materials.

Evaluation: Formative Test, Summative Test

Topic 2: Title2:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe and evaluate an application for an operational permit involving hazardous materials
2. Describe how to verify appropriate information and supporting documents to conduct a plan review of a hazardous operation, including:
 - Hazardous Materials Inventory Sheet
 - Hazardous Materials Management Plan
 - Materials Safety Data Sheet
 - Area Business Plan
3. Describe how to conduct a hazard analysis, including:
 - Describing and evaluating the Hazardous Material Classification of each hazardous material listed
 - Identifying occupancy classification in accordance with the California Building Code
 - Evaluating location of hazards material(s) to be stored
 - Evaluating quantities of hazardous materials(s) to be stored
4. Describe how to verify storage requirements in accordance with the California Fire Code

Discussion Questions

1. What smells? Should you care?
2. What other types of architectural, mechanical, and electrical plan reviews are pertinent to hazardous operations and hazardous material plan reviews?

Activities

1. In small groups, given a hazardous operation involving the use of hazardous materials; conduct a hazard analysis.

Evaluation: Formative Test, Summative Test

Topic 3: Hazardous Materials Storage Control Areas.....1:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe and evaluate the maximum quantities of hazardous materials per control area
2. Identify the requirements for the number of control areas
3. Describe and evaluate the locations of control areas
4. Describe and evaluate the exiting and egress requirements per control area
5. Describe how to coordinate control area separation requirements with architectural drawings and the California Building Code
6. Describe how to coordinate separation requirements and ventilation requirements with mechanical drawings

Discussion Questions

1. What are the differences between Group B laboratory and Group L laboratory control areas?

Activities

1. Given a floor plan and a list of chemical quantities, evaluate the need, location, construction, and means of egress of control areas.

Evaluation: Formative Test, Summative Test

Unit 5: Manufacturing, Processing, Use, Storage, Handling, and Dispensing of Hazardous Materials

(CTS: 2-8)

Topic 1: Exterior and Interior Manufacturing Processing, Use, Storage, Handling, and Dispensing.....2:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe how to conduct a hazard analysis, including:
 - Describing and evaluating the Hazardous Material Classification of each hazardous material listed
 - Container or storage vessel type
 - Identifying occupancy classification in accordance with the California Building Code
 - Evaluating location of hazardous material(s) to be stored
 - Evaluating quantities of hazardous materials(s) to be stored per control area
2. Describe and evaluate storage requirements for exterior hazardous material manufacturing, processing, use, storage, handling, and dispensing, including:
 - Separate from other container/vessels or other hazardous materials in accordance with the California Fire Code
 - Separate from property line and/or important buildings
 - Separate from combustibles
3. Describe and evaluate storage requirements for interior hazardous material manufacturing, processing, use, storage, handling, and dispensing, including:
 - Verifying separation of incompatible materials
 - Verifying presence of automatic fire sprinklers

- Verifying explosion control measures
- Verifying limit controls such as temperature and pressure
- Verifying emergency alarms as required in California Fire Code
- Verify noncombustible floor construction

Discussion Questions

1. What concerns specific to exterior storage, handling and use should a plans examiner address during plan review? Sources of ignition? Vehicular protection?

Activities

1. Given a Group B laboratory in a multi-story/multi-tenant building; conduct a hazard analysis and identify potential hazards, concerns, and issues that should be verified at plan review.

Evaluation: Formative Test, Summative Test

Topic 2: Open and Closed Systems Requirements.....1:00

Terminal Learning Objective (TLO): **At the end of this topic, the student will be able to**

Enabling Learning Objectives (ELO):

1. Describe how to conduct a hazard analysis, including:
 - Describing and evaluating the Hazardous Material Classification of each hazardous material listed
 - Container or vessel type(s)
 - Open or closed system
 - Identifying occupancy classification in accordance with the California Building Code
 - Evaluating location of hazards material(s) to be manufactured, utilized, transferred, or distributed
 - Evaluating quantities of hazardous materials(s) to be manufactured, utilized, transferred, or distributed per control area
2. Describe and evaluate ventilation requirements
3. Describe and evaluate explosion control
4. Describe and evaluate spill/containment control

Discussion Questions

1. **[text]**

Activities

1. **[text]**

Evaluation: Formative Test, Summative Test

Topic 3: Secondary Containment for Hazardous Materials.....0:30

Terminal Learning Objective (TLO): **At the end of this topic, the student will be able to**

Enabling Learning Objectives (ELO):

1. Describe how to conduct a hazard analysis, including:
 - Describing and evaluating the Hazardous Material Classification of each hazardous material listed
 - Container or vessel type(s)
 - Open or closed system
 - Evaluating location of hazards material(s) to be manufactured, utilized, transferred, stored, or distributed
 - Evaluating quantities of hazardous materials(s) to be manufactured, utilized, transferred, stored, or distributed per control area
2. Identify the size of secondary containment for a manufacturing, use, transfer, storage, or distribution area
3. Identify rain water run-off concerns according to the California Fire Code
4. Identify fire protection water containment in association with secondary hazardous material containment

5. Identify the requirements for spill control monitoring
6. Describe and evaluate inside versus outside requirements for secondary containment
7. Describe and evaluate open versus closed system requirements for secondary containment
8. Describe and evaluate liquid hazardous material(s) versus solid hazard material(s) forms of secondary containment

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Unit 6: Requirements for Spraying and Dipping of Flammable and Combustible Liquids (CTS: 2-8)

Topic 1: Terminology0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe common terminology related to hazardous materials spraying and dipping, including:
 - Flammable liquid storage cabinets
 - Spray paint booths
 - Limited spraying areas
 - Dip tanks
 - Powder coating
 - Liquid transfers

Discussion Questions

1. What are some of the processes that utilize dip finishing?

Activities

1. Complete a crossword puzzle or word search

Evaluation: Formative Test, Summative Test

Topic 2: Requirements1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe how to conduct a hazard analysis, including:
 - Describing and evaluating the Hazardous Material Classification of each hazardous material listed
 - Describing and evaluating the application operation (spray versus dipping)
 - Identifying occupancy classification in accordance with the California Building Code
 - Evaluating location of application/hazards material(s) being considered
 - Evaluating quantities of hazardous materials(s) to be stored
 - Sources of ignition
2. Describe spraying applications
 - Spray Painting Booths
 - Size
 - Listing by testing laboratory
 - Filters
 - Fire protection
 - Class I electrical
 - Interlocking
 - Ignition sources
 - Floor construction

- Fire protection
- Ventilation/exhaust
- 3. Describe limited spraying operations, including:
 - Size
 - Frequency
- 4. Describe dipping/powder coating applications, including:
 - Location application
 - Construction of dip tank
 - Dip tank covers
 - Fire protection
 - Conveyor system
 - Ignition sources

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Unit 7: Medical and Laboratory Gas Systems (CTS: 2-8)

Topic 1: Terminology0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe the following terms related to medical and laboratory gas systems, including:
 - Cylinder/vessel type
 - Proposed gas
 - Pressure relief devices
 - Gas cabinets
 - Zone valves
 - Medical gas alarms
 - Bulk supply/reserve supply

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 2: Evaluating Medical and Laboratory Gas Systems1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe how to conduct a hazard analysis, including:
 - Describing and evaluating the Hazardous Material Classification of each hazardous material listed
 - Describing and evaluating the distribution and use operation
 - Identifying occupancy classification in accordance with the California Building Code
 - Evaluating location of application/hazards material(s) being considered
 - Evaluating quantities of hazardous materials(s) to be stored
 - Ignition sources

2. Describe and evaluate the need for safety and warning signage
3. Describe and evaluate cylinder and container storage requirements
4. Describe and evaluate proposed gas and associated hazards
5. Describe and evaluate the piping distribution system for use
6. Describe and evaluate protection from ignition sources
7. Describe and evaluate medical gas alarm systems
8. Describe and evaluate location and access of zone valves for emergency shut-off
9. Describe and evaluate bulk supply versus reserve supply as required in NFPA 99

Discussion Questions

1. What are some examples of occupancies that might use medical gas?

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Unit 8: Evaluating Refrigerant Systems (CTS: 2-8)

Topic 1: Terminology0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe the following terms related to refrigerant systems, including:

- Refrigerant classification per mechanical code
- Liquid refrigerant
- Gas refrigerant
- Storage container
- Relief devices
- Compressor
- Condenser
- Evaporator
- Leak detection emergency alarm
- Emergency shut-off

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Topic 2: Evaluating Refrigerant Systems1:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

1. Describe how to conduct a hazard analysis, including:
 - Describing and evaluating the Hazardous Material Classification of the refrigerant utilized
 - Evaluating the quantities of refrigerant per California Mechanical Code Table 11-1
 - Identifying occupancy classification in accordance with the California Building Code
 - Evaluating location of application/hazards material(s) being considered
 - Evaluating quantities of hazardous materials(s) to be stored
2. Describe and evaluate storage tank type and location
3. Describe and evaluate piping and delivery system
4. Describe required safety features of the refrigeration machinery room as outlined in the California

Mechanical Code

5. Describe how to verify if the machinery equipment is roof mounted and location of piping distribution
6. Describe how to verify rationale analysis for acceptance testing of leak detection system

Discussion Questions

1. What are the hazards of refrigeration systems to firefighter safety?

Activities

1. Given a sample refrigeration disclosure form, evaluate a proposed system for compliance with CFC and CMC requirements.

Evaluation: Formative Test, Summative Test

Unit 9: Evaluate Alternative Fuels for Motorized Vehicles (CTS: 2-8)

Topic 1: Terminology0:30

Terminal Learning Objective (TLO): **At the end of this topic, the student will be able to**

Enabling Learning Objectives (ELO):

1. Describe the following terms related to alternative fuels for motorized vehicles, including:
 - Compressed natural gas
 - Liquid natural gas
 - Propane
 - Hydrogen
 - Tank/container
 - Filling
 - Venting
 - Support
 - Protection
 - Dispensing system
 - Gas detection system
 - Emergency shut-off

Discussion Questions

1. **[text]**

Activities

1. **[text]**

Evaluation: Formative Test, Summative Test

Topic 2: Evaluating Alternative Fuels for Motorized Vehicles1:00

Terminal Learning Objective (TLO): **At the end of this topic, the student will be able to**

Enabling Learning Objectives (ELO):

1. Describe how to conduct a hazard analysis, including:
 - Describing and evaluating the Hazardous Material Classification of each fuel utilized
 - Describing and evaluating the dispensing application operation
 - Evaluating location of fuel storage being considered
 - Evaluating location of dispensing equipment
 - Evaluating quantities of fuel to be stored
2. Describe and evaluate the need for safety and warning signage
3. Describe and evaluate protection relating to weather, structural support, and vehicular damage
4. Describe and evaluate tank/container for approval
5. Describe and evaluate the dispensing equipment listing for use
6. Describe and evaluate protection from sources of ignition
7. Describe and evaluate location and access to emergency shut-off

PLAN REVIEW OF ARCHITECTURAL FEATURES, FIRE OPERATIONAL FEATURES, AND HAZARDOUS MATERIALS COURSE
SYLLABUS

Discussion Questions

1. [text]

Activities

1. [text]

Evaluation: Formative Test, Summative Test

Summative Testing	1:00
Formative Testing.....	2:00
